The Role of Emotion in Collaborative Environments

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Abstract

Our work is concerned with interaction between inhabitants of 3D collaborative virtual environments (CVEs). Such environments are arenas for people who cannot, or do not want to, come together physically, to meet virtually and debate, discuss, even dispute certain issues. However, important indicators that we employ and take for granted in face-to-face interaction are usually missing, most notably the ability to express one's attitude and emotional state through non-verbal means. We propose to enrich the user experience in CVEs by incorporating an emotional channel alongside the conventional informational content, focussing on a set of facial expressions.

1. Introduction

Showing emotions, empathy and understanding through facial expressions and body language is central to human interaction. More recently, emotions have also been linked closely with decision-making, problem solving and intelligence in general [1]. We therefore argue that computer-based communication technologies ought to emulate this in some way. We have conducted an experimental study on visualisation and recognition of emotion in the human face and a 3-D animated face. The study used six "universal" facial expressions of emotion, as established by Ekman [2]: happiness, surprise, anger, fear, sadness, disgust, together with the neutral expression.

Results show that emotions can be visualised with a limited number of facial features, and build a potentially strong basis for communication in collaborative environments. However, the study has also shown that the approach does not work automatically for all expressions, or for all variations of a particular emotion. Instead, it is advisable to concentrate on the highly distinctive facial clues and leave out the more subtle details as they potentially confuse an observer [3]. Figure 1 shows a sample set of expressions that have proven to be most distinctive.

To further establish the possible role emotions can play in collaborative environments, we are currently concentrating on real-time interaction. A group of people enters the virtual space and is assigned a task to complete. They will be represented by humanoid "avatars" and able to control the facial expression of their representations. Furthermore, they will perceive facial expressions of emotion in their fellow inhabitants.
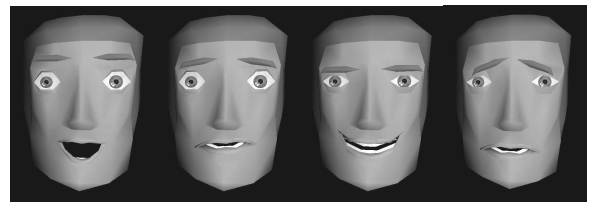

Figure 1: Facial expressions depicted by virtual head
(from left: surprise, fear, happiness, sadness)

The main objective of the experiment is to investigate how the perception of emotion affects individual and group experience in the virtual world. From the real world, we know that emotions of others influence us in our decisions and in our own emotional state. Emotions can motivate, encourage, can help us achieve things. But they can also change our mood to the negative, make us feel angry or sad when someone else feels that way. Emotions are contagious, and their contagious nature in the real world is potentially transferable and beneficial to the virtual world. In the long term, we see this as informing design of a new style of Human Computer Interaction, modelled more closely on our natural human-to-human mode of interaction.

2. References

[1] Damásio A., *Descarte's Error: Emotion, Reason and the Human Brain*, Avon Books, New York (1994)

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[3] Fabri M., Moore D.J., Hobbs D.J., Face Value: Towards Emotionally Expressive Avatars, *AISB Proceedings (AECSI)*, April 2002, London (2002)